FIG. 1

5 BACKUP ROLLER

7 CARRIER-AGENT-REMOVING ROLLER OF REVERSE ROTATION

6 PRINTING MEDIUM

3 INTERMEDIATE TRANSFER MEMBER

VISCOELASTICITY CONTROL MEANS

4 HEATER

2 PHOTOCONDUCTIVE MEMBER

TEMPERATURE CONTROL MEANS

1 DEVELOPING ROLLER

8

2

1

8

2

1

2

8

1

8 CARRIER-AGENT-REMOVING ROLLER OF FORWARD ROTATION

FIG. 2

(A) TONER-PARTICLE-UNMOLTEN CONDITION

TONER PARTICLE

(B) LIQUID-TONER-SOFTENED CONDITION

CARRIER AGENT

TONER PARTICLES
BONDED TOGETHER

(C) TONER-PARTICLE-LIQUEFIED CONDITION

CARRIER AGENT

COMPLETELY MOLTEN
TONER PARTICLES

FIG. 3

(A) PROCESS FOR CAUSING CARRIER AGENT TO FLOAT UP

7 CARRIER-AGENT-REMOVING ROLLER
OF REVERSE ROTATION

BLADE

BIAS
VOLTAGE

MOVING DIRECTION
OF TONER IMAGE

3
INTERMEDIATE
TRANSFER
MEMBER

(B) PROCESS FOR REMOVING CARRIER AGENT

7 CARRIER-AGENT-REMOVING ROLLER
OF REVERSE ROTATION

REVERSE DIRECTION

3 INTERMEDIATE TRANSFER MEMBER

FIG. 4

5
BACKUP ROLLER

6
PRINTING MEDIUM

3
INTERMEDIATE
TRANSFER MEMBER

7
CARRIER-AGENT-REMOVING
ROLLER OF REVERSE
ROTATION

WITHIN 2,000 ms

FIG. 5

7
CARRIER-AGENT-REMOVING ROLLER
OF REVERSE ROTATION

RE-DISPERSION CAUSED BY
CARRIER AGENT

IMMEDIATELY AFTER REMOVAL
OF CARRIER AGENT

AFTER ELAPSE
OF SEVERAL SECONDS

FIG. 6

(A) AFTER TRANSFER OF MAGENTA, CARRIER AGENT IS REMOVED

8
CARRIER-AGENT-REMOVING ROLLER
OF FORWARD ROTATION

← MAGENTA

3 INTERMEDIATE TRANSFER MEMBER

(B) AFTER TRANSFER OF YELLOW, CARRIER AGENT IS REMOVED

8
CARRIER-AGENT-REMOVING ROLLER
OF FORWARD ROTATION

← YELLOW
← MAGENTA

3 INTERMEDIATE TRANSFER MEMBER
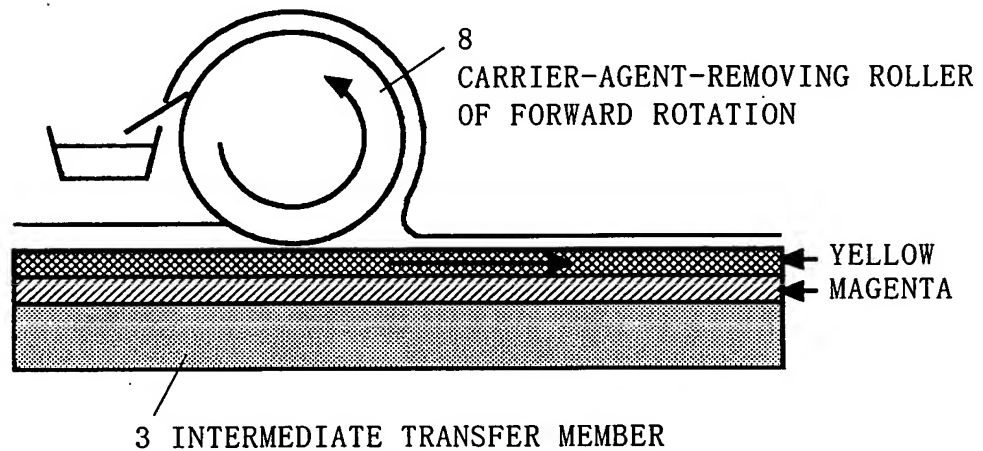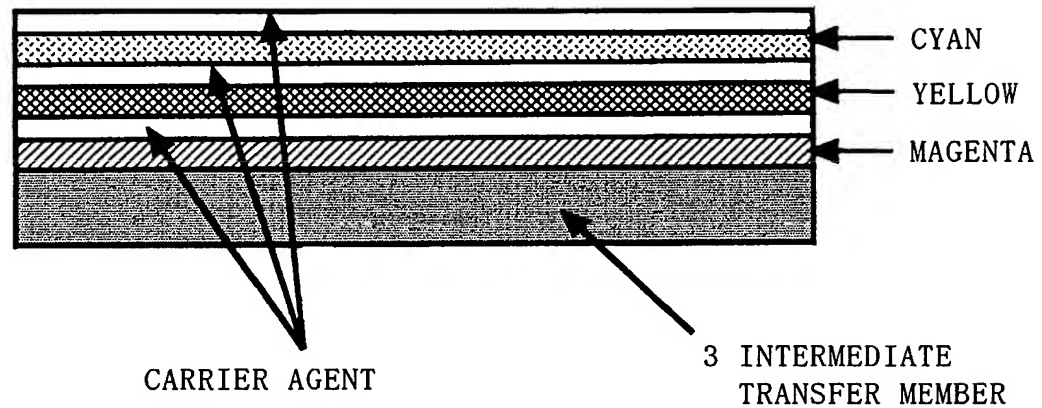
FIG. 7

(A) WHEN REMOVAL OF CARRIER AGENT IS NOT PERFORMED
    IN EACH TRANSFER OF TONER IMAGE IN EACH COLOR

CYAN

YELLOW

MAGENTA

CARRIER AGENT

3 INTERMEDIATE
TRANSFER MEMBER

(B) WHEN REMOVAL OF CARRIER AGENT IS PERFORMED
    IN EACH TRANSFER OF TONER IMAGE IN EACH COLOR

CYAN

YELLOW

MAGENTA

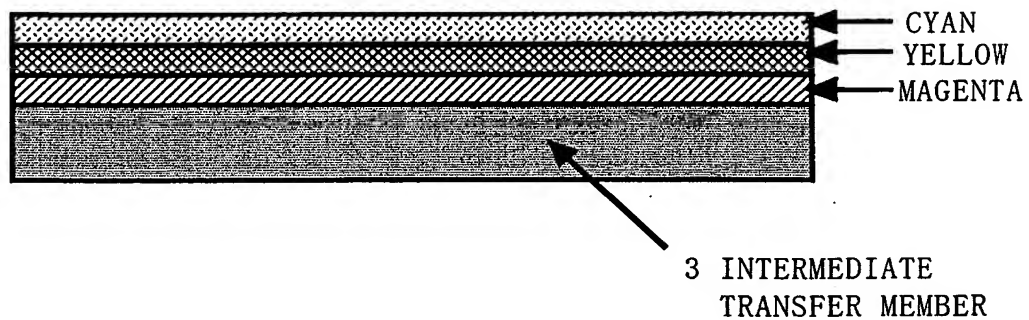3 INTERMEDIATE
TRANSFER MEMBER

FIG. 8

5
BACKUP ROLLER

PRESSING FORCE

3
INTERMEDIATE
TRANSFER MEMBER

6
PRINTING MEDIUM

ENTRY
OF PRINTING MEDIUM

FIG. 9

5
BACKUP ROLLER

9
PRINTING-MEDIUM-HEATING
ROLLER

6
PRINTING MEDIUM

4
HEATER

9
PRINTING-MEDIUM-HEATING
ROLLER

3
INTERMEDIATE TRANSFER MEMBER

FIG. 10

5
BACKUP ROLLER

3
INTERMEDIATE
TRANSFER MEMBER

6
PRINTING
MEDIUM

BIAS VOLTAGE

ENLARGED VIEW

5 BACKUP ROLLER

6 PRINTING MEDIUM

3 INTERMEDIATE TRANSFER MEMBER

FIG. 11

(A)

5
BACKUP ROLLER

3
INTERMEDIATE
TRANSFER MEMBER

USE OF RUBBER MATERIAL
AS OUTERMOST SURFACE

(B)

5 BACKUP ROLLER

6
PRINTING
MEDIUM

3
INTERMEDIATE
TRANSFER MEMBER

PRESS-DEFORMED
TO INCREASE CONTACT AREA

FIG. 12

PRIOR ART

52
BACKUP ROLLER

53
PRINTING MEDIUM

54
HEATER

50
PHOTOCONDUCTIVE
MEMBER

51
DEVELOPING
UNIT

51
DEVELOPING
UNIT

51
DEVELOPING
UNIT

51
DEVELOPING
UNIT

FIG. 13

(A)

PRINTING MEDIUM

F 3

TONER IMAGE

F 1

IMAGE-BEARING MEMBER

F3: ADHESIVE FORCE FOR
ADHESION OF TONER IMAGE
TO PRINTING MEDIUM

F2: COHESIVE FORCE
OF TONER IMAGE PARTICLES

F1: TONER-IMAGE-HOLDING FORCE
OF IMAGE-BEARING MEMBER

(B)

VISCOELASTICITY VS. TRANSFER

100%-TRANSFER
-ENABLED REGION

F 3

F 1

F 2

GENERATED FORCE [N]

25

20

15

10

5

0

1.E+11 1.E+10 1.E+09 1.E+08 1.E+07 1.E+06 1.E+05 1.E+04 1.E+03 1.E+02

UNMOLTEN
CONDITION

SEMI-MOLTEN
CONDITION

COMPLETELY MOLTEN
CONDITION

STORAGE MODULUS OR LOSS MODULUS [Pa]
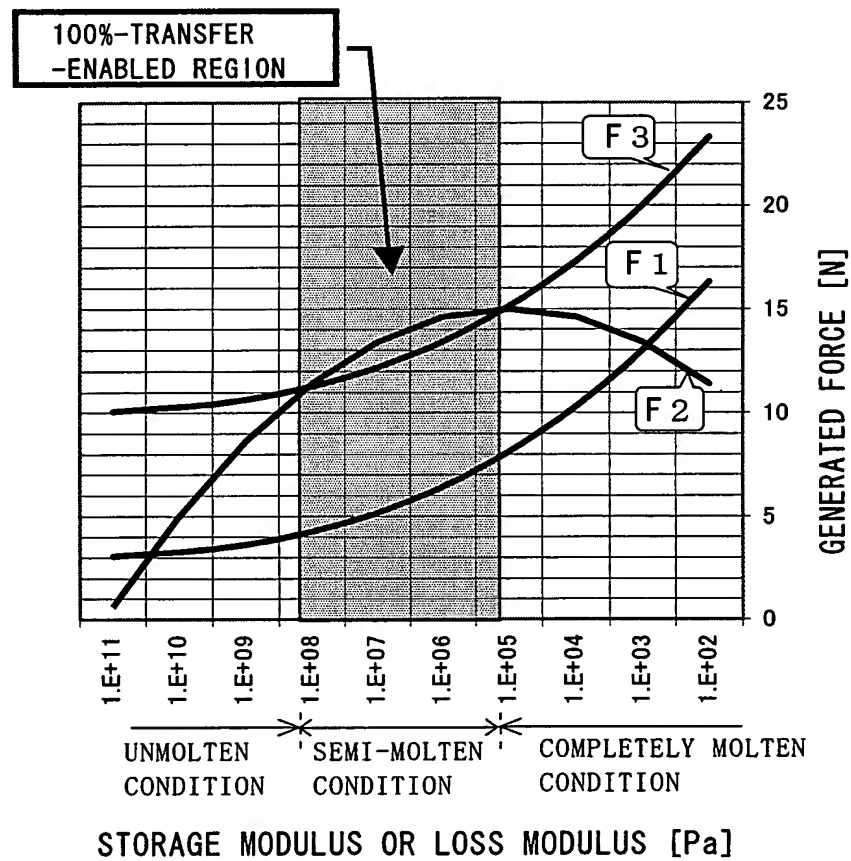
FIG. 14

VISCOELASTICITY VS. GENERATED FORCES ACTING
ON TONER PARTICLES

STORAGE MODULUS OR LOSS MODULUS [Pa]	F1: TONER-HOLDING -FORCE OF IMAGE-BEARING MEMBER [N]	F2: COHESIVE FORCE OF TONER [N]	F3: ADHESIVE FORCE FOR ADHESION TO MEDIUM (PAPER) [N]
1.E+02	16.31	11.4	23.31
1.E+03	13.00	13.4	20.00
1.E+04	10.29	14.6	17.29
1.E+05	8.12	15.0	15.12
1.E+06	6.43	14.6	13.43
1.E+07	5.16	13.4	12.16
1.E+08	4.25	11.4	11.25
1.E+09	3.64	8.6	10.64
1.E+10	3.27	5.0	10.27
1.E+11	3.08	0.6	10.08